ACTIVITIES AND FINANCIAL STATUS
WASTE TREATMENT AND IMMOBILIZATION PLANT (WTP)
LINE ITEM – 01-D-416

Subprojects:

Low-Activity Waste Facility	-01-D-16A
Analytical Laboratory	-01-D-16B
Balance of Facilities	-01-D-16C
High-Level Waste Facility	-01-D-16D
Pretreatment Facility	-01-D-16E

FISCAL YEAR 2007

MID-YEAR REPORT
HANFORD SITE, WASHINGTON

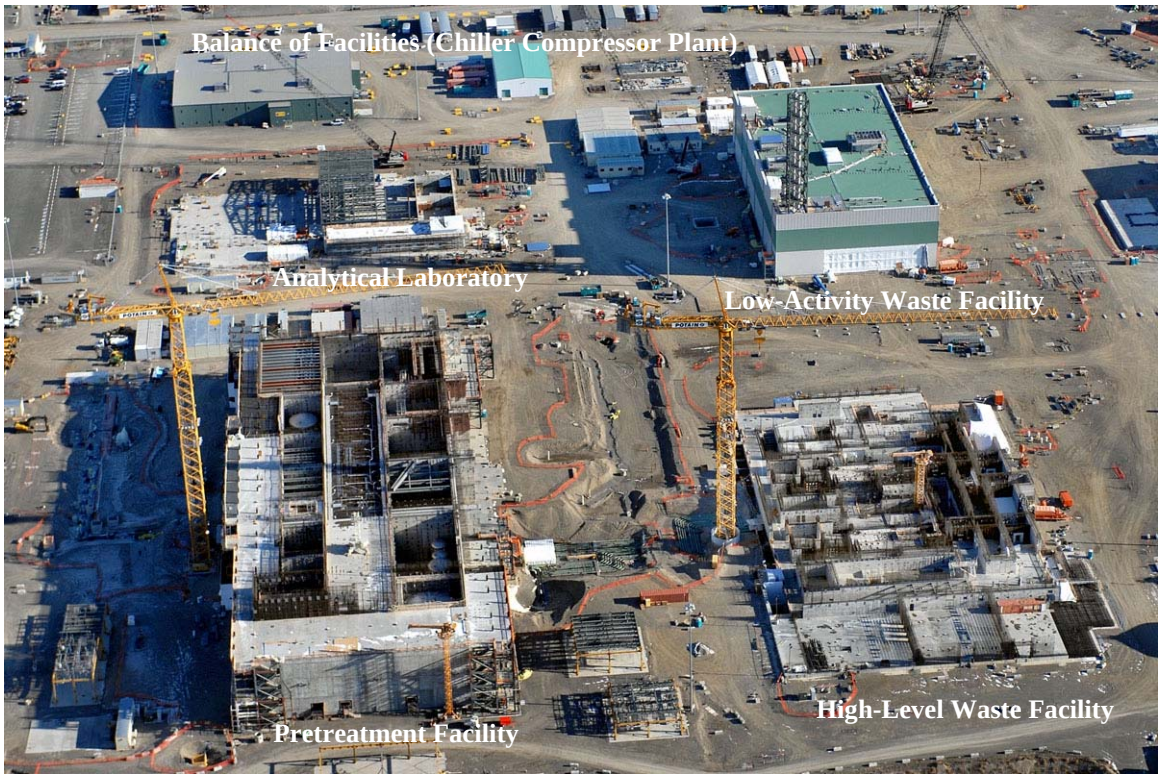


TABLE OF CONTENTS

FIGURES

TABLES

ACRONYMS

ABAR	Authorization Basis Amendment Request
ACWP	Actual Cost of Work Performed
ANSI	American National Standards Institute
BCP	baseline change proposal
BCWP	Budgeted Cost of Work Performed
BCWS	Budgeted Cost of Work Scheduled
BNI	Bechtel National, Inc.
BOF	Balance of Facilities
CAR	corrective action request
CIO	continuous improvement opportunity
CPI	cost performance index
CV	cost variance
DCMA	Defense Contract Management Agency
DDT	detonation-to-deflagration
DEI	Dominion Engineering, Inc.
DNFSB	Defense Nuclear Facilities Safety Board
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
EAC	Estimate at Completion
EIA	Electronic Industries Alliance
EVMS	Earned Value Management System
FY	fiscal year
HLW	High-Level Waste [Facility]
HPAV	hydrogen in piping and ancillary vessels
HVAC	heating, ventilating and air conditioning
LAB	Analytical Laboratory
LAW	Low-Activity Waste [Facility]
NASA	National Aeronautics and Space Administration
OE	Office of Price Anderson Enforcement
ORP	Office of River Protection
PT	Pretreatment [Facility]
RGM	revised ground motion
SPI	schedule performance index
SQR	supplier quality representative
SSI	soil/structure interaction
SV	schedule variance
TRA	Technology Readiness Assessment
TRL	Technology Readiness Level
USACE	U.S. Army Corps of Engineers
WBS	Work Breakdown Structure
WTP	Waste Treatment and Immobilization Plant

1.0 INTRODUCTION

The Conference Report accompanying the Energy and Water Development Appropriations Act, 2006 (H. R. Conference Report No. 109-275) requested the U.S. Department of Energy (DOE) "to report by December 1, 2005, on the actions taken to rectify the management failures of the Waste Treatment and Immobilization Plant (WTP) project, and to report quarterly, beginning on January 1, 2006, on the activities and financial status of each of the subprojects within WTP." This report provides the status as of the end of the second quarter of fiscal year (FY) 2007.

This report also satisfies a requirement of the Senate Appropriations Committee Report 109-274 accompanying the Energy and Water Appropriations Bill, 2007 (H.R. 5427) that states "the Committee directs the Department to submit a quarterly report to the Committee on Appropriations describing all interactions between the Department and the Defense Nuclear Facilities Safety Board (DNFSB) regarding the WTP. The report should include, but not be limited to, issues resolved, issues unresolved and corrective actions taken by the Department."

Hanford's WTP is a vital project for DOE and the nation. The WTP will provide the means to clean up millions of gallons of radioactive waste at the Hanford Site, located in Washington State, and will be the world's largest chemical-radioactive waste treatment facility. The overall WTP Project objective is to build a facility with the capacity to treat and immobilize approximately 53 million gallons of radioactive waste stored in 177 underground storage tanks.

The WTP is a massive enterprise comprising five separate facilities:

- Low-Activity Waste (LAW) Facility
- Analytical Laboratory (LAB)
- Balance of Facilities (BOF) – BOF is made up of 20 components
- High-Level Waste (HLW) Facility
- Pretreatment (PT) Facility

Each facility fulfills a key function in pretreating and immobilizing waste at the Hanford Site.

This report provides a snapshot of the WTP project performance utilizing the contractor's Earned Value Management System (EVMS). Also included are key job-site accomplishments in the first and second quarters and planned activities for the third and fourth quarters of FY 2007. The report also covers project challenges and initiatives in the areas of project planning and management, contractor performance, resolution of technical issues, certification of EVMS, certification of revised seismic ground motion criteria, and engagement with the DNFSB.

DOE is fully committed to ensuring successful management of the WTP Project by exercising prudent project management and controls, executing and maintaining a credible cost and schedule baseline, resolving technology issues, and recruiting highly experienced personnel to plan, execute, and oversee this all-important project.

2.0 FINANCIAL STATUS – AS OF MARCH 31, 2007

Table 1 presents the December 2006 Performance Baseline for the WTP Project that was approved by the Department in accordance with DOE Order 413.3A, *Program and Project Management for the Acquisition of Capital Assets.* This Performance Baseline is based upon a May 2006 Estimate at Completion (EAC) provided to DOE by the WTP Contractor (Bechtel National, Inc.[BNI]), and incorporates recommendations received from a U.S. Army Corps of Engineers (USACE) independent validation review. The Performance Baseline assumes consistent annual funding of $690 million from FY 2007 through construction and commissioning completion.

Table 1. December 2006 Performance Baseline ($M)

Base Cost	$8,786
Management Reserve/Contract Contingency/Fee	$2,278
Total, Contract Scope Cost	$11,064
Project Contingency	$1,014
Other Project Cost	$135
Transition Cost (from Privatization Contract)	$50
Total Project Cost	**$12,263**

DOE has received requests for revisions to the Base Cost totaling $408 million, $152 million from Contract Contingency and $256 million from Project Contingency. These changes were envisioned in the December 2006 Baseline. At that time, there were a number of activities where there were only rough estimates and/or Monte Carlo risk analysis for the costs. The funds were included for: 1) Contract Contingency – activities included in the contract which cover cost/ schedule uncertainty and technical risks, and 2) Project Contingency – DOE directed changes and risks outside of the contract. The Contract Contingency requests include funds for: revisions to plant equipment based on recommendations from the External Flowsheet Review Team and additional testing for the pulse jet mixer pumps. The Project Contingency requests include funds for: resequencing of facility completions and preliminary design for an aluminum leaching process. DOE is in the process of evaluating these requests for revisions and will utilize contingency funds for approved changes.

2.1 FY 2007 Funding and Commitments

Table 2 on the next page displays the total funding available of $940 million for FY 2007, which includes $690 million of FY 2007 New Budget Authority, and $250 million of FY 2006 uncosted, but committed, carryover.

Table 2. FY 2007 Funding and Commitments

Funding	Dollars (in millions)
FY 2006 Uncosted Carryover	$250
FY 2007 New Budget Authority	$690
Total FY 2007 Funding Available	$940
Estimated FY 2007 Spending Forecast	$558
Estimated FY 2007 Ending Uncosted	$382
BNI's Termination Liability*	$135
Procurement Commitments **	$247
Current & Estimated Commitments	$382
Total - Uncommited Carryover Funds	**$0**

* BNI termination liability includes BNI Labor ($45M), and termination liability for suppliers/subcontractors and leases ($90M).
** BNI commitments to subcontractor work in progress, equipment in fabrication, materials on order, and long-lead items that will be needed over the next few years.

2.2 FY 2007 Spend Plan

Table 3 displays the current planned spending amount of $558 million of FY 2007 funds for the Bechtel contract and technical support to the Office of River Protection.

Table 3. FY 2007 Planned Spending

Planned Spending	Dollars (in millions)
Subtotal: Bechtel National Inc.	**$539**
Seismic analysis, technical and estimate reviews as well as technology support to ORP:	
U.S. Army Corps of Engineers (USACE) - Structural Design Reviews	$4
Pacific NW National Lab (PNNL) - Boreholes and Seismic Analysis	$9
ORP Support - Technical & Project Controls	$4
Savannah River National Laboratory (SRNL) - Technical Support	$2
Subtotal: ORP Technical Support	**$19**
Total	**$558**

2.3 FY 2007 Cost Status

The total cost-to-date for the WTP Project is $3,622M, which includes all BNI costs ($3,442M), BNI fee paid ($103M), technical support ($27M), and transition costs ($50M). Table 4 provides a quarterly breakout of BNI-only planned spending through FY 2007, and BNI-only actual cost through March 2007. The variance from the "plan" to "actual" is discussed in Section 3.2, EVMS Performance Data

Table 4. BNI-Only Planned Spending ($M) - Quarterly

	Q1 FY 2007		Q2 FY 2007		Q3 FY 2007		Q4 FY 2007		FY 2007 Cumulative Total	
	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual	Plan	Actual to-date
Totals	**75**	**100**	**145**	**129**	**134**		**185**		**539**	**229**

3.0 BNI PROJECT STATUS – AS OF MARCH 31, 2007

Tables 5 through 11 provide project status based on reports from the BNI Project Controls' EVMS. The EVMS data is being submitted against the December 2006 Performance Cost and Schedule Baseline.

BNI is in the process of implementing an EVMS that fully complies with the American National Standards Institute (ANSI)/Electronic Industries Alliance (EIA)-748, *Earned Value Management Systems*. As part of the EVMS certification process, in November 2006 the Defense Contract Management Agency performed an audit of BNI's EVMS systems and processes. BNI is addressing the audit team recommendations. EVMS is a proven, industry standard management tool for planning and monitoring project performance. It is planned for the system to be certified by Fall 2007.

3.1 EVMS Cost Status

Table 5 provides the cumulative actual cost of work performed as recorded by BNI for each of the five facilities during FY 2007, a forecast of FY 2007 year-end spending, and percentage of actual cost and forecast cost as compared to the December 2006 Performance Baseline's Budget At Completion (BAC), which excludes management reserve.

Table 5. BNI-Only Cost Status ($M) – Facility Percent

Facilities	Budget At Completion (Dec 06)	Total Spent through FY 2006 (ACWP)*	Actual Spent through FY 2007 (2nd Qtr)		Forecast FY 2007 Spent	
			Total ACWP	% Spent	Forecast Total ACWP	% Spent
Low-Activity Waste	1,395	726	802	58%	889	64%
Analytical Lab	523	140	162	31%	185	35%
Balance of Facilities	960	363	384	40%	416	43%
High-Level Waste	2,331	769	813	35%	909	39%
Pretreatment	3,577	1,215	1,281	36%	1,411	39%
Total	**8,786**	**3,214**	**3,442**	**39%**	**3,809**	**43%**

* ACWP is the Actual Cost of Work Performed.
** Difference in total due to rounding.

3.2 EVMS Performance Data

Tables 6 and 7 present performance data at the facility level by monthly and cumulative earned value data by facility for the second quarter FY 2007. EVMS data is represented by the following performance measures:

Budgeted Cost of Work Scheduled (BCWS) – the "Plan"
Budgeted Cost of Work Performed (BCWP) – what was accomplished or "Earned"
Actual Cost of Work Performed (ACWP) – what the work "Cost"

Schedule performance is tracked using the following indices:

Schedule Variance (SV) = BCWP – BCWS; the comparison of work planned versus work performed. A positive SV means that more work has been performed or "earned" than was scheduled, while a negative SV denotes that less work was performed than was scheduled, thus being "behind" schedule. Generally, a positive schedule variance is a positive gauge for the project schedule performance.

Schedule Performance Index (SPI) = BCWP/BCWS; the ratio of the work performed over the work planned. A SPI greater than 1.0 indicates being "ahead" of schedule, while a SPI of less than 1.0 would indicate being "behind" schedule. Generally, a SPI greater than one is a positive gauge for the project schedule performance.

Cost performance is tracked using the following indices:

Cost Variance (CV) = BCWP – ACWP; the comparison of the cost of the work performed versus the actual cost of the work performed. A positive CV means that it cost less to accomplish the work performed than was estimated, while a negative CV denotes that it cost more to accomplish the work performed than was estimated. Generally, a positive cost variance is a positive gauge for the project cost performance.

Cost Performance Index (CPI) = BCWP/ACWP; the ratio of the estimated cost of the work performed over the actual cost of the work performed. A CPI greater than 1.0 indicates being "under" cost, while a CPI less than 1.0 would indicate being "over" cost. Generally, a CPI greater than one is a positive gauge for the project cost performance.

Table 6 represents the monthly earned value data at the end of each month in the second quarter of FY 2007.

Table 6. BNI-Only Monthly Earned Value Data ($ in thousands)

Month	BCWS	BCWP	ACWP	SV	SPI	CV	CPI
Jan 07	41,606	32,467	26,975	(9,139)	0.78	5,492	1.20
Feb 07	40,510	36,557	40,309	(3,953)	0.90	(3,752)	0.91
Mar 07	63,041	55,312	61,794	(7,729)	0.88	(6,482)	0.90
2Q FY07	145,157	124,336	129,078	(20,821)	0.86	(4,742)	0.96

Note: These values represent BCWS/BCWP/ACWP as reported in BNI's monthly cost reports.

Table 7 provides cumulative earned value data, by facility, at the end of each month for the second quarter of FY 2007.

Table 7. BNI-Only Cumulative Earned Value Data ($ in thousands)

Fac/Month	BCWS	BCWP	ACWP	SV	SPI	CV	CPI
LAW	772,211	760,358	776,300	(11,853)	0.98	(15,942)	0.98
LAB	163,896	152,495	154,097	(11,401)	0.93	(1,602)	0.99
BOF	379,758	382,600	375,437	9,928	1.01	7,163	1.02
HLW	831,455	827,615	794,306	(18,494)	1.00	33,309	1.04
PT	1,258,050	1,253,116	1,240,201	(4,934)	1.00	12,915	1.01
Jan 2007	3,405,371	3,376,184	3,340,340	(29,186)	0.99	35,844	1.01
LAW	784,471	767,131	769,147	(17,340)	0.98	(2,016)	1.00
LAB	167,046	156,275	160,396	(10,771)	0.94	(4,121)	0.97
BOF	380,969	384,394	359,662	9,928	1.01	24,732	1.07
HLW	844,298	835,117	821,065	(18,494)	0.99	14,052	1.02
PT	1,269,126	1,269,825	1,270,379	699	1.00	(554)	1.00
Feb 2007	3,445,910	3,412,742	3,380,649	(33,168)	0.99	32,093	1.01
LAW	791,795	771,831	802,274	(19,964)	0.97	(30,443)	0.96
LAB	169,655	161,975	161,907	(7,680)	0.95	68	1.00
BOF	386,796	388,249	383,750	1,453	1.00	4,499	1.01
HLW	861,533	850,534	812,981	(10,999)	0.99	37,553	1.05
PT	1,299,145	1,295,464	1,281,531	(3,681)	1.00	13,933	1.01
Mar 2007	3,508,924	3,468,053	3,442,443	(40,871)	0.99	25,610	1.01

* May be differences in totals due to rounding.

Summary Explanation of Variances

The following gives a summary explanation of the variances for the project-to-date (or cumulative) Schedule Variance (SV) and Cost Variance (CV).

Cumulative SV – March 2007 Status: Schedule Variance = ($40.9M)
Schedule Performance Index (SPI) = 0.99

The $40.9M cumulative unfavorable SV primarily consists of an unfavorable SV of $28M in Plant Equipment and Material, and an unfavorable SV of $7.6M in Engineering.

The Plant Equipment and Material variance is caused by difficulty in restarting suppliers and resolving technical constraints (e.g., revised ground motion [RGM] and External Flowsheet Review Team [EFRT] recommendations) on new and existing orders. The project is revitalizing the supply chain, factoring market conditions into the schedule, and expecting the remainder of the SV to reverse by summer 2007 and be worked off by December 2007 with no effects on the construction critical path. About half of the Engineering variance is temporary, caused by work on EFRT and capacity increase tasks that cannot be earned because, although the work is authorized, the work scope is not yet implemented in the baseline. BNI expects to reverse the total trend by May and fully recover by December 2007. The schedule calls for increasing engineering staff to recover schedule performance. In response to the competitive labor market, the project is enhancing recruitment and retention efforts. A break-out of the major contributors to the unfavorable cumulative to-date SV include the following:

- In the PT Facility, Plant Equipment has an unfavorable SV of $7.6M due to 1) need to rebid heating, ventilating and air conditioning (HVAC) blowers, air handlers, and centrifugal fans; 2) continuing sequencing difficulties with piping installation; and 3) need to remove and repair fireproofing due to installation timing difficulties
- In the HLW, Plant Equipment has an unfavorable SV of $4.7M due to 1) impact of RGM analysis delays on Crane Mounted Power Manipulators; 2) impact of funding limitations, RGM analysis delays, and redesign of melter cave cranes on High Integrity Cranes
- In the Lab, Plant Equipment has an unfavorable SV of $3.2M due to 1) a delay in the fabrication and delivery schedule of the manipulators, and 2) delay in the delivery of a waste transfer system
- In the HLW, Engineering Design has an unfavorable SV of $2.4M due to adjustment in civil/structural work priorities, late electrical vendor information, slowdown of HLW design, and confirmation of effects of revised seismic criteria on plant equipment.

BNI anticipates that these (negative) variances will increase over the next couple of months, and then begin to reverse with the SPI at 1.0 at the overall project level by January 2008.

Cumulative CV – March 2007: Cost Variance = +$25.6M
Cost Performance Index (CPI) = 1.01

Cumulative cost variance to date is a favorable $25.6M, while the cost variance in the 2nd Quarter of FY 2007 was an unfavorable $4.7M. The primary drivers for the cumulative favorable CV of $25.6M include good performance of $20.6M in Construction, made up of notably favorable CVs consisting of:

- $8.4M in PT Crafts
- $8.9M in HLW Crafts
- $2.8M in BOF Crafts
- $1.7M in BOF Subcontracts

The cumulative favorable Construction Craft CVs in PT and HLW are mainly for concrete, structural steel, piping, and equipment installation. When construction restarts and progresses into the upper elevation in PT and HLW, the complexity and congestion of construction is expected to affect the favorable CV. The favorable BOF performance was associated with large excavations and large installations of pipe and electrical bulk commodities. The rest of the BOF commodities are much smaller in scale, past economies of scale may not be achieved going forward.

Other favorable CV performance includes:

- $13.6M in Plant Equipment
- $4.2 in Acquisition Services
- $6.8M in Shared Service

The following EVMS Control Accounts are experiencing unfavorable CVs:

- $14.8M in Plant Material, due primarily to unfavorable performance in PT structural steel and LAW pipe commodities.
- $3.4M in Engineering Design Plant Wide, due primarily to higher than planned self-assessment efforts, preparations for and involvement in management reviews, added supervision, support to outside audits, and more document revisions due to hydrogen in piping and ancillary vessels (HPAV) impacts. Mitigation measures include a BCP (baseline change proposal) to address delays due to EFRT issues, an assessment of the vendor print cycle is underway to provide information into reducing vendor print review cycles, and a reduction in material and installation costs for HPAV quantities provides an offset to the engineering cost increases.
- $3.8M in Engineering Design LOE – Plant Wide, due primarily to training. Corrective actions include a review of future training requirements and an assessment of potential impacts. This and aggressive management oversight will help mitigate impact.

3.3 Facility Completion Status

Table 8 displays the project design, procurement, and construction status of each of the five facilities. The percentages are based on the 2006 Performance Baseline that was recently approved by the Department.

The WTP design is approximately 78 percent complete, procurement is 43 percent complete, and construction is approximately 30 percent complete. The reconstituted nuclear construction infrastructure at WTP, represented by thousands of engineers and onsite craft labor, has overcome numerous technical obstacles, such as the degradation of the United States industrial nuclear component fabrication capability. WTP personnel have successfully installed about 167,000 cubic yards of concrete, 9,229 tons of structural steel, 251 tons of HVAC ducting, 36.4 miles of piping, 47 miles of conduit, and 33.5 miles of cable and wire.

Table 8. Percent Complete by Facility Through 2Q, FY 2007

Facilities	Design (Hours)	Procurement (Dollars)	Construction (Hours)
Low-Activity Waste	92%	61%	46%
Analytical Lab	86%	31%	38%
Balance of Facilities	84%	41%	50%
High-Level Waste	80%	41%	22%
Pretreatment	70%	40%	26%
Total WTP Completion Status	78%	43%	30%

3.4 Design Status

Table 9 provides the status of the facility design progress through the end of the second quarter of FY 2007. Progress on design tasks are measured on a person-hour basis. Design percent completes are based on the number of engineering hours earned divided by the total budgeted engineering hours for that facility.

Table 9. Facility Design Status (Hours – Thousands)

Facilities	Total Budget At Completion (Dec 2006)	Total Hours Earned through FY 2006 (actual)	Total Hours Earned to Date (2Q, FY 2007)		Forecast Earned Hours through FY 2007	
			Hours	% Complete	Hours	% Complete
Low-Activity Waste	1,546	1,360	1,426	92%	1,491	96%
Analytical Lab	468	390	404	86%	426	91%
Balance of Facilities	662	538	556	84%	597	90%
High-Level Waste	2,458	1,896	1,970	80%	2,087	85%
Pretreatment	4,009	2,710	2,793	70%	2,954	74%
Total Design	9,142	6,895	7,149	78%	7,555	83%

*** Differences in totals are due to rounding.**

3.5 Procurement Status

Table 10 provides the status of the facility procurement progress through the end of the second quarter of FY 2007. Procurement progress is measured on a dollar basis. Procurement entails the purchasing of all the building material and equipment needed to construct the plant, such as structural steel, concrete, piping, ductwork, electrical trays and cables, electronics, laboratory equipment, and specialized items.

Table 10. Procurement Status ($M)

Facilities	Total Budget At Completion (Dec 2006)	Total Dollars Earned through FY 2006	Total Dollars Earned to Date (2Q, FY 2007)		Forecast Dollars Earned through FY 2007	
			Dollars	% Complete	Dollars	% Complete
Low-Activity Waste	613	352	372	61%	412	67%
Analytical Lab	200	55	63	31%	73	37%
Balance of Facilities	391	158	161	41%	173	44%
High-Level Waste	950	364	388	41%	446	47%
Pretreatment	1,471	565	593	40%	668	45%
Total	**3,625**	**1,494**	**1,576**	**43%**	**1,772**	**49%**

*** Differences in totals are due to rounding.**

3.6 Construction Status

Table 11 on the next page provides the status of the facility construction progress through the end of the second quarter of FY 2007. Construction progress is measured in number of craft-hours earned associated with the quantity of commodities installed.

Table 11. Construction Status (Craft Hours - Thousands)

Facilities	Total Budget At Completion (Dec 2006)	Total Earned through FY 2006	Total Hours Earned to Date (2Q, FY 2007)		Forecast Earned Hours through FY 2007	
			Hours	% Complete	Hours	% Complete
Concrete	705	624	649	92%	689	98%
Steel	306	206	214	70%	247	81%
Piping	612	163	208	34%	304	50%
Electrical	563	108	123	22%	138	25%
Equip/Other	848	153	189	22%	217	26%
Total Low-Activity Waste	**3,034**	**1,254**	**1,383**	**46%**	**1,596**	**53%**
Concrete	230	172	188	82%	209	91%
Steel	80	1	32	40%	72	90%
Piping	172	64	64	38%	65	38%
Electrical	117	4	4	3%	6	5%
Equip/Other	238	29	31	13%	37	15%
Total Analytical Lab	**835**	**270**	**319**	**38%**	**388**	**46%**
Concrete	407	256	280	69%	288	71%
Steel	46	13	15	33%	22	48%
Piping	430	267	270	63%	290	67%
Electrical	364	130	147	41%	165	45%
Equip/Other	1,293	536	564	44%	592	46%
Total Balance of Facilities	**2,540**	**1,201**	**1,277**	**50%**	**1,357**	**53%**
Concrete	3,237	1,214	1,225	38%	1,225	38%
Steel	580	40	41	7%	41	7%
Piping	972	25	26	3%	26	3%
Electrical	756	61	62	8%	62	8%
Equip/Other	1,408	112	154	11%	195	14%
Total High-Level Waste	**6,954**	**1,452**	**1,508**	**22%**	**1,549**	**22%**
Concrete	3,709	2,042	2,054	55%	2,055	55%
Steel	905	119	123	14%	125	14%
Piping	3,385	268	272	8%	274	8%
Electrical	812	66	66	8%	66	8%
Equip/Other	1,497	161	200	13%	239	16%
Total Pretreatment	**10,308**	**2,656**	**2,715**	**26%**	**2,758**	**27%**
Concrete	8,288	4,308	4,396	53%	4,467	54%
Steel	1,918	380	425	22%	506	26%
Piping	5,569	787	840	15%	958	17%
Electrical	2,612	368	403	15%	436	17%
Equip/Other	5,285	990	1,138	22%	1,280	24%
Total Construction	**23,671**	**6,833**	**7,202**	**30%**	**7,647**	**32%**

*** Differences in totals are due to rounding.**

4.0 FACILITY ACTIVITY AND PLANNING – AS OF MARCH 31, 2007

The accomplishments for the first and second quarters of FY 2007 are provided for each facility, along with the plans for the third and fourth quarters of FY 2007. An aerial photograph for each facility provides a snapshot of construction accomplishment.

4.1 Low-Activity Waste (LAW) Facility – 01-D-16A

The LAW Facility immobilizes (vitrifies) the low-activity fraction of the waste for onsite (Hanford) disposal.

Figure 1. Low-Activity Waste Facility

Accomplishments for 1st and 2nd Quarters FY 2007

- Installed the exhaust stack increasing the height of the facility to 190 feet.
- Finished roof underlayment and panel installation and panel installation on main building.
- Finished siding installation on main building.
- Continued to place second tier concrete walls for the container export bay.
- Demobilized the tower crane.

Plans for 3rd and 4th Quarters FY 2007

- Pour the Annex concrete basemat.
- Complete placement of container export bay second tier walls.
- Install the permanent equipment access hatches on the roof penthouses.
- Pour the Melter concrete assembly pads.
- Issue all the primary piping drawings for fabrication.
- Receive the Container Finishing Line swab and monitoring system.
- Receive the Container Finishing Line jib crane.

4.2 Analytical Laboratory – 01-D-16B

The LAB provides analysis of the waste at different points throughout the treatment and immobilization process to validate the characteristics of the waste and to better optimize the processing of the waste.

Figure 2. Analytical Laboratory

Accomplishments for 1st and 2nd Quarters FY 2007

- Started the placement of structural steel in the center portion of the facility. Steel is being installed up to and including the roof supports.
- Completed piping installation in the C3 cell.

Plans for 3rd and 4th Quarters FY 2007

- Complete the installation of the facility structural steel for the main portion of the facility.
- Deliver hot cell maintenance area jib cranes.
- Start the installation of HVAC ducting.
- Complete the installation of fire protection piping in the main portion of the facility.
- Complete all Mechanical Handling system engineering.
- Receive the last main structural steel.
- Complete installation of the main structural steel.

4.3 Balance of Facilities (BOF) – 01-D-16C

The BOF is made up of approximately 20 support facilities and the common area encompassing the remaining elements of the WTP, including the Glass Former Storage Facility, Chiller Compressor Plant, and Water Treatment Plant.

Figure 3. Chiller Compressor Plant

Accomplishments for 1st and 2nd Quarters FY 2007

- Placed the concrete slab to the Glass Former Facility.
- Installed the compressed air system expansion tank and separators.
- Received six main Chilled Water Circulation Pumps.
- Installed the Diesel Fuel Oil Cathodic Protection System.
- Completed all subcontract work in the Water Treatment Facility.
- Completed fabrication of the Glass Former Facility electrical control panels.

Plans for 3rd and 4th Quarters FY 2007

- Receive the silos for the Glass Former Storage Facility.
- Install the 4.16 kV switch gear.
- Complete installation of the fire protection system in the Chiller Compressor Facility.
- Receive the non- important-to-safety (ITS) transformers.
- Complete all Mechanical Handling engineering.

Table 12 provides the status for the 20 support facilities and two common areas that comprise the scope of Balance of Facilities. The "Common Scope" comprises mostly design work that is common to the facilities**.** "Site Work" consists of the general earthwork and utilities across the site and between facilities, and is not associated with a particular facility. Note that several Facilities are fully designed and constructed. The Schedule Completion Date column represents acceptance (A) of a Facility after successful start-up and testing.

Table 12. Design and Construction Status of Balance of Facilities

Facility	Engineering % Complete	Construction % Complete	Scheduled Completion Date
Guard House Facility	100	100	JUL 2002 – A
Administrative Building	100	100	JUL 2002 – A
Maintenance Shop	100	100	OCT 2002 – A
Warehouse Building	100	100	NOV 2002 – A
Steam Plant Facility	99	98	AUG 2007
Fire Water Pump House Facility	98	96	OCT 2007
Cooling Tower Facility	99	97	OCT 2007
Water Treatment Building	97	65	NOV 2007
Fuel Oil Facility	99	91	NOV 2007
BOF Switchgear Building	91	79	MAY 2008
Chiller Compressor Plant	97	68	MAY 2008
Erected Tanks - Process/Potable	100	99	JUN 2008
Non-Dangerous, Non-Radioactive Effluent Facility	81	76	JUL 2008
Anhydrous Ammonia	10	0	NOV 2008
Switchgear Building	93	79	NOV 2010
Simulator Facility	96	85	NOV 2010
Failed Melter Storage	16	2	NOV 2010
Diesel Generators Facility	54	0	MAR 2011
Glass Former Storage Facility	85	3	JUN 2011
Wet Chemical Storage Facility	58	0	MAY 2014
Common Scope	82	19	OCT 2014
Site Work	91	48	OCT 2014

4.4 High-Level Waste (HLW) Facility – 01-D-16D

The HLW Facility immobilizes (vitrifies) the high-level fraction of the waste for offsite disposal.

Figure 4. High-Level Waste Facility

Accomplishments for 1st and 2nd Quarters FY 2007

- Issued rebar calculations for slabs at 0-foot elevation and walls from 0-14-foot elevation.
- Issued the steel design for the main frame for the 14-foot elevation.
- Issued the detailed piping design for the HLW Concentrate Receipt System.
- Issued the piping stress calculations for the HLW Concentrate Receipt System.
- Issued design criteria and desk instructions to resolve the design concerns regarding embedded pipe bends (joggles) from hot cells to outer cells.
- Issued for construction 90 percent of corridor piping below +14-foot elevation for secondary offgas and process vessel ventilation system.
- Issued for Construction the remaining 0-foot elevation slabs.
- Issued the committed system design package for non-radioactive liquid waste disposal.
- Issued piping joggle design criteria.
- Shipped Container Decontamination Swab/Monitoring System.
- Completed fabrication of decontamination and canister storage crane.
- Issued concrete design for three areas of 14-foot elevation slabs.
- Issued piping design for non-radioactive liquid waste disposal.

Plans for 3rd and 4th Quarters FY 2007

- Issue platform calculations for 37-foot elevation.
- Revise piping joggle drawings for 0-foot elevation.
- Complete testing of melter cave/crane/power manipulator.
- Award fabrication of electrical joggles for up to 14-foot elevation.
- Deliver decontamination swabbing and monitoring crane maintenance shield door.
- Complete HVAC Environmental Qualification calculation for loss of cooling condition.
- Deliver decontamination tank.

4.5 Pretreatment (PT) Facility – 01-D-16E

The PT Facility separates the tank waste into its low-activity and high-level waste fractions.

Figure 5. Pretreatment Facility

Accomplishments for 1st and 2nd Quarters FY 2007

- Completed 75 percent of seismic rebar calculations for 56- to 77-foot elevation concrete walls in November 2006.
- Completed 50 percent of the rebar calculations for the 56-foot elevation floor slab in December 2006.
- Completed initial engineering study on ultrafilter sizes.
- Provided nozzle load analysis for evaporators provided to fabricator.
- Completed preliminary piping jumper layout for PT hot cell.
- Awarded contract for Engineering Scale Process System.
- Issued waste particle size and density report.

Plans for 3rd and 4th Quarters FY 2007

- Issue design for 4,000 tons of steel to be fabricated (77-foot elevation).
- Initiate design for capacity modifications.
- Complete fabrication and delivery of two shield doors.
- Complete soil/structure interaction (SSI) analysis for the PT Annex Building.
- Complete revised ground motion and SSI analysis for PT Control Building.
- Complete HVAC system design for the PT Control Building for general occupancy areas.
- Complete pulse jet mixer multiple overblow testing and issue final report.
- Complete oxidative leaching titration test and receive draft report.

5.0 PROJECT ISSUES – AS OF JUNE 30, 2007

5.1 Certification of Earned Value Management System

Issue: DOE has directed BNI to implement a certified Earned Value Management System that complies with the ANSI/EIA-748 standard. The *John Warner National Defense Authorization Act for Fiscal Year 2007,* Section 3120, includes a limitation of funds, pending the certification by the Secretary of Energy "that the Defense Contract Management Agency has recommended for acceptance the earned value management system used to track and report costs of the Waste Treatment and Immobilization Plant." This limited obligation or expense of no more than 90 percent of the funds available for the project.

Discussion: In November 2006, BNI underwent an EVMS certification review conducted by the Defense Contract Management Agency (DCMA) against the 32 elements of ANSI/EIA-748. The EVMS review resulted in eight Corrective Action Requests (CAR), three major and five minor, plus three Continuous Improvement Opportunities (CIO). In February 2007 the WTP contractor, BNI, submitted their Corrective Action Plan for review. A follow-up review was conducted by Tecolote Research, Inc, a nationally recognized firm, in May 2007, and a report is to be delivered to the Department on July 2, 2007. Tecolote has indicated that each of the 8 findings have been successfully resolved and the EVMS meets the intent of the ANSI Standard.

A summary of the eight CARs and three CIOs is as follows:

- CAR-01: Level of Effort vs. Discrete: Too much work assigned as level of effort and there is discrete work that is scheduled as level of effort. *Minor*
- CAR-02: Planning Packages: Certain planning packages have been used to address changes to open work packages, rework, and/or claims. ***Major***
- CAR-03: BCWS and Schedule Misalignment: There are instances where the time-phased budget in the cost accounting system (COBRA) has different time periods than the Primavera (P3) schedule timeframe. *Minor*
- CAR-04: Overstating BCWP on Plant Equipment: For Plant Equipment, COBRA is applying the percent complete to the "to-go sales tax and escalation" and adding it to the BCWP for the work already performed. *Minor*
- CAR-05: BCWP Not Taken in Same Manner as BCWS was Planned: The BCWS was based on linear rate per month, but the BCWP was based on actual work performed estimated every other month. ***Major***
- CAR-06: Start Dates for Plant Equipment Purchase Order (PO) Line Items for Multiple Facilities: The start date for all equipment orders is based on the date for the first purchase order line item. *Minor*
- CAR-07: Baseline Change Proposal: There was a baseline change proposal that was issued for multiple control accounts, but the work being transferred was not readily traceable. *Minor*
- CAR-08: WBS: The WBS is not product-oriented at a low enough level, but instead transfers to an Organizational Breakdown Structure (OBS). ***Major***
- CIO-001: Schedule Float: The method in which schedule hammocks and lags are applied effect float calculation, damaging integrity of schedule.

- CIO-002: Integration of Automated Systems: Contractor systems are not electronically linked and scheduling software is an old version.
- CIO-003: Span of Control: Control Accounts, Summary Work Packages and Work Packages are long in duration and large in dollar value.

Outlook: DOE is planning to have the EVMS certified by the Secretary of Energy in the Fall 2007. EVMS is a proven, industry standard management tool for planning and monitoring project performance.

5.2 Certification of Final Seismic and Ground Motion Criteria

Issue: There is concern as to when the seismic and ground motion criteria will be considered final. Congressional language states that the construction on the PT and HLW Facilities may not restart until the "Secretary of Energy certifies to the Congressional Defense Committees that the final seismic and ground motion criteria have been approved by the Secretary and that the contracting officer for the Waste Treatment and Immobilization Plant Project has formally directed that the final criteria be used for the final design of the Pretreatment Facility and the High-Level Waste Facility."

Discussion: A number of key actions have been implemented to progress towards finalizing the seismic and ground motion criteria: issuance of the WTP *Structural Design Criteria*, Revision 10, and the drilling of deep boreholes and collection of soil characterization data under the project site.

Structural Design Criteria, Revision 10. *Structural Design Criteria*, Revision 10, issued in December 2005, provides requirements and guidance that implements the interim ground motion criteria. This revision was established through consultation with the DNFSB.

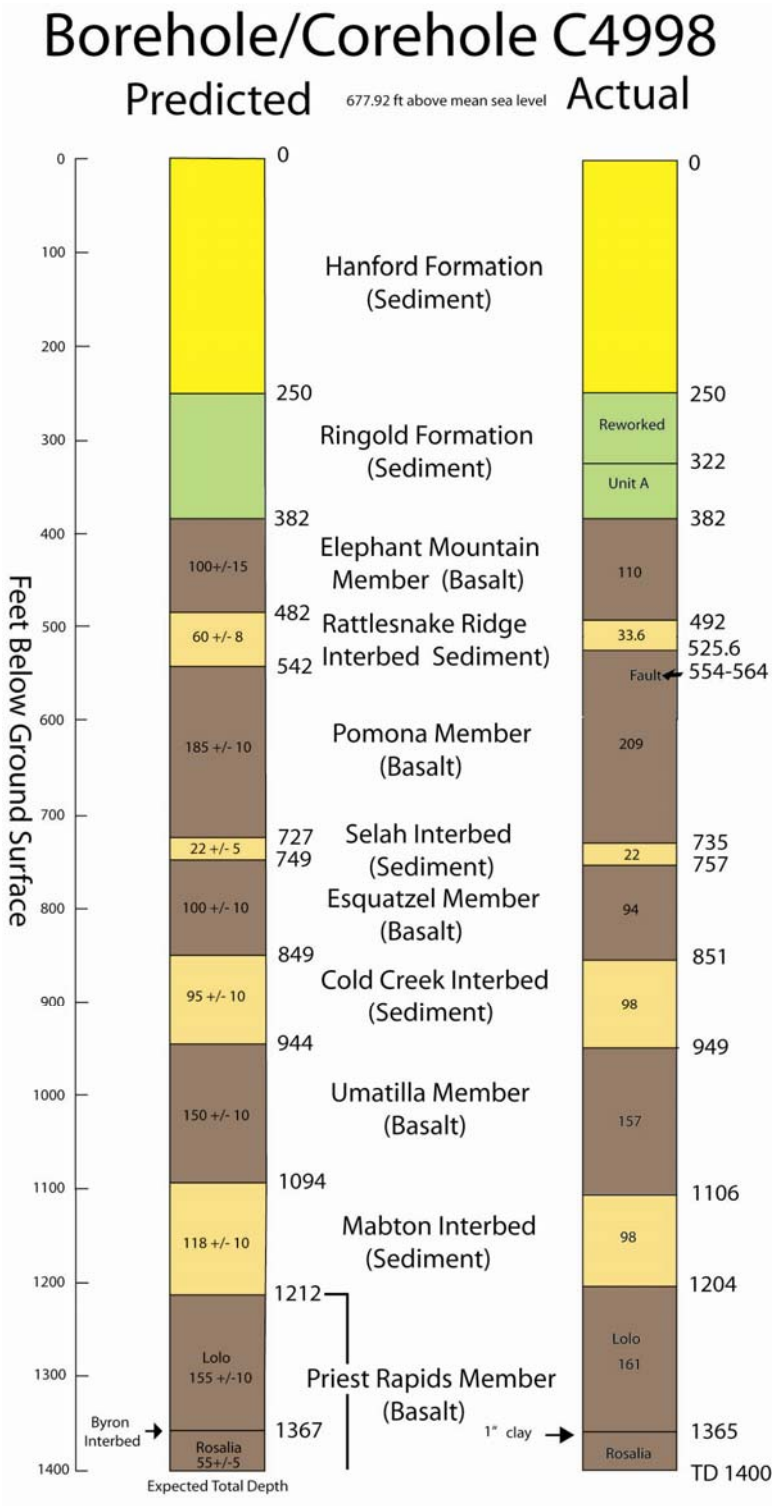
Deep Boreholes. To determine the margin of conservatism in the current estimate of the RGM criteria, DOE has conducted a program of deep bore drilling to collect soil characterization data and confirm the geophysical properties of the layers of bedrock below the WTP.

Borehole drilling commenced in June 2006 and was completed in October 2006. Three deep boreholes and one corehole have been drilled into the basalt bedrock and sedimentary interbeds that underlie the Hanford Site to the appropriate depths (approximately 1,400 feet). Each borehole accesses the basalt zone through steel-cased entry holes that are drilled to isolate bedrock from shallower sediments. Downhole seismic testing began in October 2006 and was completed in March 2007. Geophysical and seismic measurement tools were deployed in the deep boreholes to obtain critical data and seismic measurements. The analysis of the geophysical properties in May 2007 confirmed the margin of conservatism in the horizontal and vertical responses at the site selected for construction of the WTP, due to earthquakes. A final report was issued in June 2007.

The model below (Figure 6) represents results of the predicted versus actual subsurface characterization from the corehole drilled under the WTP footprint. The predicted versus actual interbed thicknesses have only minimal variations and, more importantly, the velocity contrast between the interbeds and basalt layers is greater than assumed in 2005; this supports the conclusion that the 2005 criteria are conservative. Also, the higher velocity contrasts imply lower ground motion at the surface. This verifies that the required margin of conservatism in the seismic design criteria is adequate. Results from the remaining boreholes show similar characteristics.

Outlook: Pacific Northwest National Laboratory together with a team of nationally renowned experts in the fields of geology, seismology, and structural design experts completed a review of the borehole data, and geophysical logging and velocity measurements have been calculated. The results were analyzed through the Pacific Northwest National Laboratory internal release reviews; and a final data analysis report was submitted to DOE in June 2007. The *Structural Design Criteria*, Revision 10 will continue to be utilized as the design basis for the PT and HLW Facilities. Construction of the PT and HLW Facilities is planned to resume in the Fall of 2007, after the Secretary of Energy certifies the final seismic and ground motion criteria.

Figure 6. Predicted Versus Actual Subsurface Characterization Data[1]



[1] Figure 5.3 from PNNL-16303, *Borehole Summary Report for Core Hole C4998 - Waste Treatment Plant Seismic Boreholes Project*, Pacific Northwest National Laboratory, Richland, Washington (D.B. Barnett and B.J. Garcia, 2006).

5.3 Nuclear Safety Culture

Issue: DOE has been monitoring BNI's progress in response to shortcomings in the WTP nuclear safety and quality culture, previously identified within reviews by the Office of River Protection (ORP) Safety and Quality Assurance staff and the DOE Office of Price Anderson Enforcement (OE).

Discussion: BNI has undertaken a Safety and Quality Initiative to improve the overall WTP Project nuclear safety and quality culture, and issues monthly reports that outline their progress. An update meeting between BNI and OE was held on August 28, 2006. At that time, BNI provided a greater level of detail regarding their initiative that demonstrated progress toward stated goals. However, DOE determined that BNI has not yet developed a comprehensive set of performance indices to measure continuous improvement nor have they committed manpower through a resource-loaded project plan for completion of this initiative.

Outlook: The ORP Office of Environment, Safety and Quality provides oversight of BNI activities through an extensive assessment process. A number of quality assurance/quality issues have been either self-revealed, identified by ORP staff through assessments, identified by BNI's assessment activities, or disclosed through concerns identified by BNI employees. As required by ORP's assessment program, ORP reviewed these issues in late November 2006. Due to the number and nature of these issues, the ORP management team determined additional assessments of the WTP Quality Assurance Program and its implementation were necessary to better understand the extent of the quality related issues at the WTP. Additional anticipated assessments include:

- High-Level Waste Program Review against Office of Civilian Radioactive Waste Management requirements,
- Procurement Process,
- Tailored Approach to Quality Assurance Requirements,
- Corrective Action Program,
- Commercial Grade Dedication Process,
- Training Program,
- Document Control,
- Design Control.

These additional assessments represent a strong commitment by ORP senior management to quality in fiscal and personnel resources. ORP recognizes that past nuclear projects, both Federal and commercial have been adversely impacted due to ineffective or partially effective quality assurance programs. ORP believes these assessments will go a long way to identify unknown weak programmatic areas, confirm the extent of condition for known problems, and develop the appropriate corrective actions for identified issues. Also included in actions taken by BNI relative to the development of performance metrics, BNI has submitted their first quarterly report on performance objectives, measures, and commitments (POMC). This is planned to be mature by the end of 2007, and is expected to provide the needed comprehensive set of performance indices to measure continuous improvement of BNI's integrated safety management system.

5.4 Vendor Quality Assurance

Issue: ORP has identified Quality Assurance issues with BNI suppliers.

Discussion: Over the last two years, ORP has implemented a number of supplier inspections. Two suppliers are typically visited each quarter. During these visits, ORP inspectors review BNI's oversight of the suppliers, the suppliers' quality and welding programs, and work in progress. These inspections have identified a number of quality and welding issues. There was ample evidence BNI's quality oversight was identifying and verifying resolution of many technical and quality issues. However, BNI supplier oversight focused much of its attention on work in progress and final documentation of work prior to material being shipped and substantially less time on supplier quality and welding program implementation. Issues identified by ORP indicated additional oversight of supplier quality assurance and welding programs was needed.

Outlook: Based on issues identified by ORP, BNI has taken steps to address both the specific issues and to improve overall BNI Supplier Quality Representative (SQR) performance. They include: (1) issuing SQR Alerts to inform the SQRs of the issues being identified that require them to perform specific inspections to verify similar conditions are not present at their assigned facilities; (2) developing a checklist to be used by the SQRs detailing important areas to be inspected; (3) hiring a strong welding expert to both inspect suppliers' welding programs and provide technical support to the SQRs; and (4) providing group training specifically addressing the issues being identified by ORP inspectors. ORP has continued to perform supplier inspections and has identified marked improvement in BNI's efforts to oversee supplier quality programs.

6.0 DNFSB OPEN ISSUES – AS OF JUNE 30, 2007

The Assistant Secretary for Environment Management briefs the DNFSB monthly to discuss status of issues and concerns. DOE also participates in DNFSB meetings that include Safety-in-Design issues associated with the WTP.

The DNFSB provides in-depth safety and technical reviews and oversight of the project, and a number of issues have been raised and resolved. The DNFSB has a staff of over a hundred experienced technical experts both in the field at the various DOE sites and in the Washington, D.C. office. The DNFSB has resident representatives at the Hanford Site to collect information relating to Board subjects of interest. DOE routinely provides documentation and access to DOE and contractor facilities and meetings in connection with Board or staff interests. The DNFSB held a series of public meetings (July 2006, March 2007) on incorporating safety-in-design for which briefings were presented relating to the WTP. In January 2007, three Board members and staff visited the site and were briefed by BNI and ORP on WTP matters of interest. DOE will continue to meet with the DNFSB on a regular basis to discuss issues, provide status of technical issues, and make available information as requested.

6.1 Hydrogen in Piping and Ancillary Vessels

Issue: The phenomenon of concern is surge events due to accumulations of hydrogen and oxygen (for water piping) or nitrous oxide (for slurry piping) in unvented piping at WTP. The gas is radiolytically and thermolytically generated, and accumulation and ignition are assumed. Two issues exist with the potential for hydrogen in WTP piping and ancillary vessels (HPAV): (1) the hazard that challenges the safety basis for the facility, and (2) potential operability and availability issues that might result should a surge event from hydrogen accumulation occur.

Discussion: BNI has identified a set of generic solutions to address the potential for this phenomenon. These generic solutions include new and revised engineered controls, design features, and administrative controls to prevent the accumulation of hydrogen concentrations that could lead to the loss of the piping or ancillary vessel containment boundary. For pipe segments for which preventive controls are not practical, BNI has performed bounding analyses to show that these segments can withstand surge events and remain elastic; thus resulting in no loss of the confinement pressure boundary.

BNI has evaluated all pipe segments (approximately 14,200 segments) initially thought to have the potential for such accumulation in the PT and HLW Facilities. Of these, approximately 9,300 were subsequently determined not to have potential for hazardous accumulation. Of the remainder, several categories exist:

- Approximately 1,500 segments required an engineered control to purge or vent the segment, with most of these features already in the design.
- For the approximately 1,400 segments that would take over 1,000 hours to accumulate a large enough hydrogen mixture to cause damage; administrative controls were adopted.

Approximately 2,300 piping segments were evaluated to determine whether a surge event would damage the piping (exceed elastic limits). Of these, 23 pipe segments were found to require an increase in the pipe wall thickness due to the effects of a surge event, should one occur.

BNI used experimental data from worked performed for the project by the California Institute of Technology (CalTech) to calculate pipe loadings, based on a parametric analysis performed for BNI by Dominion Engineering, Inc. (DEI). Dr. Ed Rodriguez of Los Alamos National

Laboratory independently reviewed the BNI effort for BNI at ORP's suggestion, and accepted the evaluation. ORP is reviewing the BNI/DEI methodology. The most significant outstanding technical issue concerns how BNI will model the pipe hanger and support loads due to surge events. BNI is working on this issue, using techniques suggested by Dr. Shepherd (CalTech). DEI has completed a fairly detailed study of a typical system, looking at detonation (DET), deflagration (DEF), detonation-to-deflagration (DDT), and pressure reflection (PRC) events. BNI also performed an analysis using a traveling DDT pulse, as a method to simplify the overall analysis. Based on the work, BNI will review the support load results to determine which, if any, supports need to be strengthened.

Outlook: BNI has prepared seven Authorization Basis Amendment Requests (ABARs) to address the hydrogen issue safety requirements. BNI is also documenting the calculation methods for determining design loads and methods for design changes relating to surge events in the piping systems. DOE is reviewing and approving the ABARs. BNI will also update the facility design requirements documents to reflect these design changes. DOE briefed the DNFSB on the HPAV issue in January, March, and May 2007. DOE will follow up with a letter to the Board asserting closure when all significant issues have been resolved.

6.2 Fireproofing

Issue: DOE originally proposed to the DNFSB the use of an equivalency-based approach for protecting building structural steel from the effects of credible fire events. The alternative approach included installing automatic fire suppression systems for horizontal beams and the upper levels of structural steel columns. Additional fire protection sprinklers would be installed at lower levels of structural steel columns requiring additional protection. The DNFSB noted that the WTP fire suppression system is not designated a safety-class system and the structural steel will not have a two-hour fire rating.

Discussion: In response to DNFSB's comments, BNI modified their technical basis to employ an approach that provides fire protection for selected structural steel members based on their role in supporting the structure during and after a fire, instead of protecting every structural steel member. For this alternative strategy to be accepted and approved, DOE and BNI must:

- Understand precisely how loads are distributed throughout each facility.
- Account for degradation of the steel's material properties as the result of a fire.
- Demonstrate that unprotected structural members with reduced material properties due to a fire would not be relied upon to support the building.

In October 2006, BNI delivered the proposed methodology and example structural calculations for the LAW and LAB facilities to the DNFSB. To address the detailed concerns of DNFSB staff, BNI conducted additional analyses, which was discussed at a conceptual level with DNFSB at a meeting in March 2007.

In addition to the development of the alternative design criteria, two other issues related to fire protection of structural members have been resolved and are being implemented.

1. A fire protection coating material that swells when exposed to heat (intumescent) was proposed for numerous structural steel members in the LAW Facility. The qualification fire test necessary to accredit the coating for small-size structural steel columns failed to achieve a two-hour rating. Since construction on LAW could no longer be delayed, the contractor decided to use a certified cementitious protection method for protecting the smaller structural members.

2. Some intumescent fire protection coatings applied to steel members in the LAW Facility were damaged by rains during the winter of 2005/2006. A repair process has been developed for accessible members. Now that the LAW Facility siding and roofing have been completed and the building is now secure from the exterior environment, the interior intumescent repairs are being implemented.

Outlook: ORP has directed BNI to develop a comprehensive plan and schedule to address fire coatings on the other WTP facilities. BNI has initiated a three-phase process that includes (1) identifying structural steel members in remaining WTP facilities requiring coatings; (2) determining if certifications exist for the specific member sizes and shapes; and (3) where no certifications exist, either modifying the steel design for a size which has a certified listing, using an alternative coating material, conducting engineering evaluations, or conducting a fire test.

6.3 Seismic Criteria

Issue: The DNFSB sent a letter to the Secretary of Energy, dated October 17, 2005, raising issues concerning the adequacy of the seismic and ground motion criteria. The DNFSB received a letter from DOE-ORP dated June 28, 2006, regarding the ability of the design of the WTP facilities to withstand potential earthquakes. The letter requested that the DNFSB acknowledge that issuance of the WTP *Structural Design Criteria*, Revision 10, warranted closure of the ground motion criteria and structural engineering issues.

Discussion: The DNFSB stated its belief in a September 7, 2006 letter that the RGM criteria provides a reasonably conservative basis for validating the design of WTP and believes that the RGM criteria should be used to complete the design. In that letter, the DNFSB stated that the Structural Design Criteria provides a reasonably conservative basis for validating the existing design and construction of the plant. However, the details of the application of the structural design criteria in the structural analysis and the structure's predicted response to the RGM are still being developed by BNI. The details and results of these structural analyses are being provided in updates to the summary structural reports for the HLW and PT Facilities. As a follow-up, the DNFSB has requested to review these details as soon as they are available.

Outlook: The structural engineering issues raised by the DNFSB will remain open until DOE-ORP submits the summary structural reports in late CY 2007 and the DNFSB can evaluate their adequacy. The DNFSB expects that their review of the structural analysis to be reasonably straightforward.

7.0 STATUS OF ISSUES FROM PROJECT REVIEWS – AS OF JUNE 30, 2007

7.1 External Review of Process Flowsheet - Report Dated March 2006

Table 13 provides the status of the technical issues identified by the External Flowsheet Review Team. The table denotes the Issue Number (M-major, P-potential), Issue Title, date that DOE ORP approved the Issue Response Plan, and the forecasted date the issue is expected to be closed.

Table 13. Status of Issue Response Plans

Issue No	Issue Title	ORP Approval Date (2006)	Forecast Closure Date
M 7a	Lack of Spare LAW Melter	20-Nov	Nov-06(A)
M 7b	Lack of Spare HLW Melter	20-Nov	Nov-06(A)
P 3	Adequacy of Control Scheme	3-Jan-07	Dec-06 (A)
M 8	Limited Remotability Demonstration	16-Nov	Jul-07
M 9	Lack of Comprehensive Feed Testing in Commissioning	18-Dec	Jul-07
M10	Critical Equipment Purchases	3-Jan-07	Jul-07
M16	Misbatching of Melter Feed	13-Sep	Jul-07
P 1	Undemonstrated Decontamination Factor	13-Jul	Jul-07
P10	Lack of Analysis of Silo Feeds	13-Sep	Jul-07
P11	Incomplete Process Control design	18-Dec	Jul-07
M10a	Questionable Column Design	9-Aug	Aug-07
M11	Loss of WTP Expertise Base	14-Sep	Aug-07
M13	Ultrafilter Area and Flux	25-Sep	Aug-07
M14	Baseline IX resin	9-Aug	Aug-07
P 2	Effect of Recycle on Capacity	29-Jun	Aug-07
P 6	Questionable Cross-Contamination control	9-Aug	Aug-07
P 7	Complexity of Valving	9-Aug	Aug-07
P 8	Effectiveness of Cs-137 Breakthrough Monitoring System	9-Aug	Aug-07
M 5	Must Have Feed Prequalification Capability	22-Aug	Sep-07
P 5	Inadequate Process Development	9-Aug	Sep-07
M 2	Mixing Vessel Erosion	17-Nov	Dec-07
M 7	Inconsistent Short-term vs. Long-term focus	3-Jan-07	Dec-07
M17	HLW Film Cooler Plugging	9-Aug	Jan-08
M 4	Designed for Commissioning Waste vs. Mission Needs	10-Oct	Feb-08
M 1	Plugging in Process Piping	29-Jun	Mar-08
M 6	Process Operating Limits Not Completely Defined	18-Oct	Mar-08
M15	Availability, Operability, and Maintainability	13-Jul	Mar-08
P 4	Potential Gelation/Precipitation	18-Oct	Mar-08
M 3	Inadequate Mixing System Design	6-Sep	Sep-08
M12	Undemonstrated Leaching Process	13-Sep	Sep-08
P 9	Undemonstrated Sampling System	9-Aug	Sep-08

Note: (A) denotes “actual” closure date

7.2 WTP Capacity Enhancement Modifications

A key observation that resulted from the External Flowsheet Review Team evaluation was the effectiveness of the PT Facility design to process the waste to meet capacity requirements. The team estimated it could take over 35 years to treat the Hanford Site tank waste if design and process flowsheet modifications were not made.

The treatment capability of the PT Facility is affected primarily by the design capacity (the rate at which the waste is processed) and the design availability (the percentage of time the facility is operational). The relative relationship of these two parameters (design capacity and design availability) results in a potential range of waste treatment capabilities and resultant waste treatment schedules. DOE has been pursing a number of options to reduce the estimated processing schedule to 25 to 35 years.

The primary systems in the PT Facility that limit waste treatment capacity are: 1) ultrafiltration system, used to separate solids from liquids, 2) the ion-exchange system, used to remove radio-sodium from the liquids processed by the ultrafiltration solutions, and 3) the leaching system, used to limit the amount of aluminum and chromium in the high level waste glass. In response, DOE has directed BNI to implement a number of design improvements that will increase the design capability of the plant; i.e., improve ultrafiltration surface area, enhance recirculation and mixing of waste streams, provide upfront leaching of aluminum, operate filtration and leaching at higher temperatures, add the ability to remove waste heels from the process vessels, install a redundant hot cell overhead maintenance crane in PT Facility to support multiple maintenance activities, and enhance the quality of the remote valves that would require less maintenance and provide for a higher operational life. In addition, DOE has directed BNI to analyze two enhancements to the HLW Facility; i.e., develop next generation melter that can support a greater throughput of glass, and addition of stub-outs in the HLW Facility for a potential future concentrations annex.

Two primary areas of focus, ultrafiltration and waste leaching operations, are being addressed with the design, construction, and commissioning of a prototypic pretreatment test stand. The test stand will use nonradioactive simulants of tank wastes, and is scheduled to be fully operational by March 2008. This schedule supports the plan for completing the WTP design. These capacity modifications were anticipated during the preparation of the May 2006 Estimate At Completion by BNI and are included in the December 2006 Baseline.

7.3 Early Commissioning of Low Activity Waste Facility – Report dated March 2007

As part of the December 2006 Baseline, the WTP project schedule was modified to maintain the pace for construction of the LAW Facility, the LAB and the BOF. A revised completion date of FY 2012 was established. In addition, a report completed in March 2007 entitled *Evaluation of Starting the Waste Treatment and Immobilization Plant Low Activity Waste Facility First* concludes there is the potential to operate the LAW Vitrification Facility prior to completion of the PT and HLW Facilities. A few highlights of the report include: LAW treatment could begin as early as June 2014; interim operations could run for nearly 5 years in advance of the entire WTP complex; and more than 32,000 metric tons of LAW glass could be produced. As a next step, DOE is conducting a systems engineering evaluation to determine the feasibility of deploying a simple means of tank-side pretreatment to enable the early startup and hot operation of the LAW Facility by the 2014 timeframe.

The schedule being considered for the LAW Facility is being driven by the: halt in construction of PT and HLW Facilities in FY 2005 due to technical issues and incorporation of the revised seismic criteria; significant extension of plant completion from 2011 to 2019; value of beginning to process tank farm wastes to allow for more double-shell tank space; and experience to be gained in operating the less-complex process facility. While DOE remains focused on safely completing construction of the WTP Project in accordance with the validated baseline, it is essential to continue to explore strategies that may allow the mitigation of some of the delay in beginning the processing of the tank waste at the Hanford Site. A follow-up report, *Waste Treatment Mission Completion Alternatives Study,* is scheduled for completion in the Fall 2007.

7.4 Technology Readiness Assessment for the Waste Treatment and Immobilization Plant (WTP) Analytical Laboratory, Balance of Facilities and LAW Waste Vitrification Facilities Final Report dated March 2007

In November 2006, DOE initiated a Technology Readiness Assessment (TRA) of the WTP. A TRA is a process to determine the technical maturity (Technology Readiness Level [TRL]) of evolving technologies prior to incorporating them into systems or subsystems. TRLs provide an easy to communicate, common understanding of technology status. The TRA is useful for making decisions on the transition of technology from paper to laboratory to final application, for risk management, and for making funding decisions.

A standard scale for measuring TRLs was developed by the National Aeronautics and Space Administration (NASA) in the 1980s. The U.S. Department of Defense (DoD) has adopted the NASA scale and instituted the TRA process as part of its acquisition process for all new major systems. The NASA/DoD TRL scale ranges from 1 to 9 with 1 corresponding to the pre-conceptual paper stage, and 9 corresponding to full-scale operation in the actual operating environment. NASA and DoD use TRL 6 as the minimum for transitioning technology to system design and acquisition.

The DOE WTP evaluation ensured consistency with NASA/DoD practices by adopting the DoD/NASA definitions, using the TRA process described in the *Department of Defense, Technology Readiness Assessment Deskbook*[2], utilizing a TRL calculator developed by the Air Force, and engaging the help of the developer of the Air Force calculator. The TRA of the WTP was divided into three pieces, Laboratory Facility/Balance of Facilities/Low Activity Waste Facilities (LAB/BOF/LAW); High-Level Waste Facility (HLW); and Pretreatment Facility (PT). The TRAs for LAB/LBL/BOF were conducted from December 2006 through February 2007. The LAB/ BOF/LAW report was completed and issued in March 2007. The HLW and PT reports will be completed in late 2007.

7.5 U.S. Army Corps of Engineers Independent Validation Review of the May 2006 Estimate-at Completion; Report dated August 28, 2006

DOE retained the USACE to provide a comprehensive independent review of BNI's May 2006 EAC, and to validate the project baseline cost, scope, and schedule. The USACE retained a number of recognized industry experts to work alongside their senior federal staff. The focus of the validation was an evaluation of cost, schedule, project and program risk analysis, and management processes. A final qualified validation report of the May 2006 EAC was provided to DOE in August 2006, with inclusion of an additional $650 million, three months of schedule

[2] Department of Defense, *Technology Readiness Assessment (TRA) Deskbook*, May 2005, prepared by the Deputy Undersecretary of Defense for Science and Technology (DUSD(S&T)).

contingency, 8 recommendations, and 21 observations. A condition of the validation is the assumption of $690 million funding for FY 2007 and in the outyears. The issues identified by USACE and others leading up to the approval of the December 2006 Performance Baseline are summarized in the following nine categories:

Category 1) Estimate Errors or Omissions: Issues regarding labor rates and jurisdiction and the amount of field non-manual labor were identified and addressed by including additional DOE contingency in the approved baseline.

Category 2) Earned Value Management System (EVMS): The USACE findings regarding EVMS were similar to the subsequent certification review corrective actions. Data traceability, WBS and organization, span of control, and institution of robust change control procedures are being addressed by corrective action closure activities. Satisfactory closure of all corrective action is anticipated with the certification of the EVMS by the Secretary in early FY 2008.

Category 3) Management Reserve: Issues identified included lack of clear management policy on handling management reserve and technical/programmatic risk. A process for utilizing management reserve has been included in the updated Project Execution Plan, and will also be addressed as part of the contract modification.

Category 4) Contract Administration: Lack of clarity in contract terms and conditions, roles, and responsibilities have been addressed in the updated Project Execution Plan, and will be included in the contract modification. Also, shortfalls in DOE staffing needed for contract administration had been in the process of being addressed when the USACE began their review in late 2005. By the Spring 2006, the contracting and legal staff had been enhanced by the creation and filling of a GS-15 Procurement Director, two GS-14 Contracting Officers, a GS-13 Contract Specialist, a GS-12/13 Organizational Property Management Officer, and a GS-14 Procurement Attorney.

Category 5) Risk Management: Several weaknesses were identified by USACE in the risk management program including correct assignment of risk ownership, lack of oversight on contractor risks, understated risks during commissioning, calculation methodology, and inadequate DOE staffing. These issues have been addressed by recent staff additions for the contractor and government; by revising both the contractor and DOE risk management plans, as well as the Technology Readiness Assessment process.

Category 6) Schedule Management: Questions were raised regarding the project schedule logic and sequencing of activities and resource loading. These issues have been addressed through a series of contractor/government workshops and meetings. The results of these efforts produced a comprehensive revised schedule that the contractor submitted to DOE in April 2007 for review.

Category 7) Project Execution Plan: Concerns were raised over the lack of a signed DOE Project Execution Plan, which was in draft form at the time of review. Subsequent to the review, the Project Execution Plan has been updated to include the December 2006 cost and schedule baseline and the April 2007 revised schedule. The Project Execution Plan is to be approved by DOE Headquarters on July 9, 2007.

Category 8) Value Engineering: The lack of a formal DOE requirement for a contractor value engineering program was identified. Value management will be addressed as part of the upcoming contract modifications, at which time the entire concept of fee incentives will be addressed.

Category 9) Environmental Hazard Analysis: Several issues regarding the Environmental Hazard Analysis were identified. These areas of concern are being addressed as part of the renegotiation of the *Hanford Federal Facility Agreement and Consent Order* (a.k.a., Tri-Party Agreement) with representatives from Washington State. The renegotiation process is expected to take several months to complete. Once completed, the hazard analysis documentation will be made current.